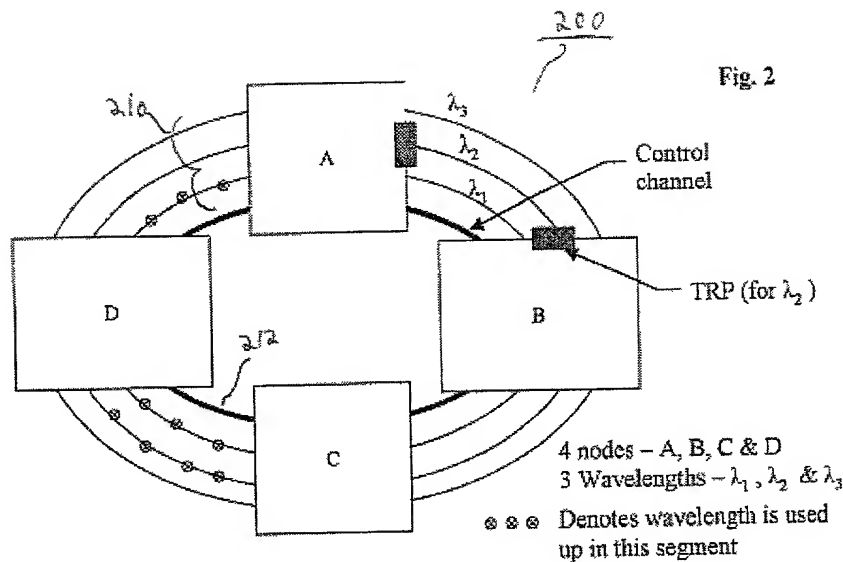


Fig. 1



To setup lightpath between A & B

1. A-B is short side, A-D-C-B is long side.
2. In A-B segment all the three wavelengths are available.
3. λ_1 is used up in A-D and D-C. λ_2 is used up in D-C.
4. λ_3 is not used anywhere - use of λ_3 means use of new wavelength
5. Path Length: (A-B) = 1, (A-D-C-B) = 3.
6. Wavelength Utilization Rate (UR) =

$$\frac{\text{No. of segments over which this wavelength is used}}{\text{Total no. of segments}}$$

For λ_1 , UR = $2/4 = 1/2$. For λ_2 , UR = $1/4$. For λ_3 , UR = 0.
7. Fragmentation (FR) = No. of contiguous segments in use + No. of contiguous segments not used

For λ_1 , FR = 1 (A-D-C) + 1 (C-B-A) = 2
 For λ_2 , FR = 1 (D-C) + 1 (C-B-A-D) = 2. For λ_3 , FR = 1 (A-D-C-B-A) = 1
 For the A-B lightpath if λ_1 is chosen, new FR = 2, if λ_2 is chosen, new FR = 4
 if λ_3 is chosen, new FR = 2
 Hence increase in fragmentation is $\lambda_1 - 0$, $\lambda_2 - 2$, $\lambda_3 - 1$.
 We prefer λ_1 which has the least increase in fragmentation.
8. TRP savings
 In A-B, TRPs are available only in λ_2 . Use of λ_2 results in TRP savings.